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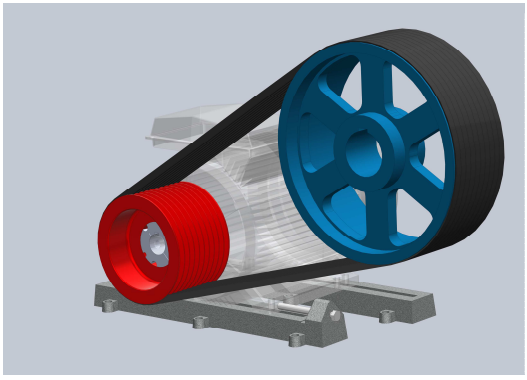
Installation and Operating Manual for

- V–Belt Drives
- Slide Rails
- Foundation Blocks



Installation and Operating Manual V–Belt Drives

- ·All V–belts used should be manufactured in conformance with standards. Thoroughly remove any residues of oil and grease and other contamination. No traces of rust are admissible on the V-belt pulleys, especially in the area of the wedged grooves.

- ·All V–belts used should be of one original set of identical length. Avoid mixtures of V–belts of different manufacturers. The V–belts should have been stored free from damages and to the state of the art according to manufacturer´s specifications. You can clean dirty V–belts with a mix of glycerine and spirit in the ratio of 1:10.

- ·It is important to install the V–belt pulleys parallel to the axis and aligning each other. Make sure that pulley concentricity and run–out tolerance will not exceed the predefined limit values according to DIN 2211 or 2217 (also refer to Table 1).

- ·For installation, approach the belt pulleys to each other until the V–belts can be mounted without using force. It is prohibited to use any aids, such as tire levers or similar, since this might lead to damage of the V–belts.

- ·If you have mounted the V-belts conforming to the grooves, tighten the drive according to manufacturer´s specifications. For this purpose, tighten the belt pulley, which can be moved parallel to the axis for tightening, by slowly turning the drive until the V–belt has reached the required initial tension. Always check the belt inital tension perpendicularly to the drawing part

- of the belt (load part) by means of appropriate strain viewers. Refer to Table 2 for the required amounts for inital tension, by using the impression depth mentioned on the continuation page of this Manual.

- After a first service period of approx. 0.5 to 2 hours, check the belt initial tension again and retighten, if required. After further approx. 20 operating hours under load, it is recommended to check and retighten again in order to compensate for the V–belt stretching during the start–up period.

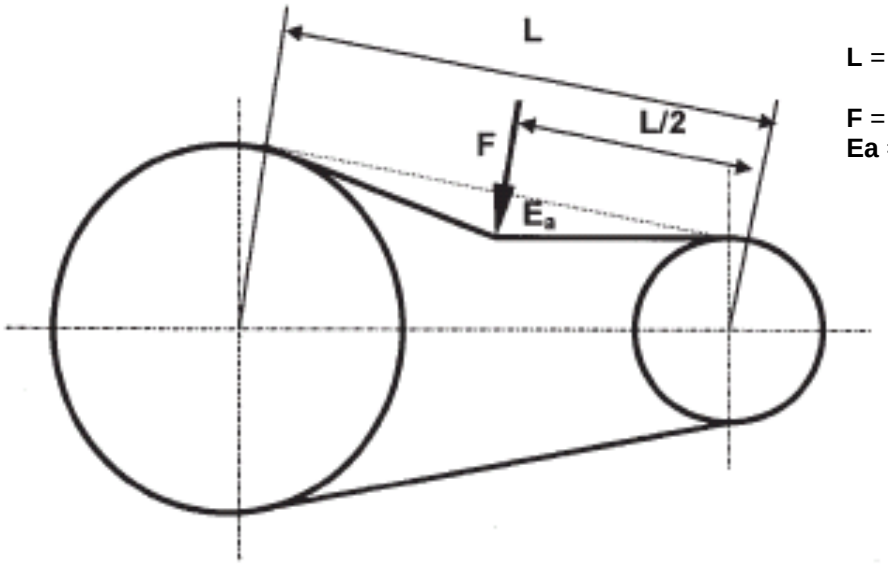
- V–belt drives using high–capacity V–belts of standardized profile series are mainly maintenance–free during operation for their entire service lives. It is advisable to regularly inspect the belts and belt pulleys for any trace of damage and wear and tear.

Table No. 1

Effektive Ø								
from	50	106	170	280	450	710	1120	1800
to	100	160	250	400	630	1000	1600	4000
Admissible pulley concentricity and run-out tolerance	0,2	0,3	0,4	0,5	0,6	0,8	1,0	1,2

Table No. 2

Profil	**Ø small Pully [mm]**	**Test force [N]**	**Impression depth per 100mm Length of freerunning part of belt**
SPZ	63 - 180	25	2,3
SPA	90 - 140	50	3,2
	160 - 250	50	2,7
SPB	140 - 200	75	3,7
	224 - 400	75	2,7
SPC	224 - 315	125	3,2
	355 - 630	125	2,7



L = Length of free-running part of belt
F = Test force
Ea = Impression depth of free-running part of belt

Example of application:

Profile SPB, Ø small pulley (e.g. motor pulley) = 180 mm, length of free–running part of belt = 460 mm
Test force from the Table = 75 N, impression depth = 3.7 x (460//100) = 17 mm.

Installation and Operating Manual Taper Bush

The **Taper Bush** system consists of conical clamping bushes with various bores in standardized sizes and the V–belt or flat belt pulleys with appropriately executed conical bore. The advantages of the taper bush system are easy assembly and dismantling and the capacity of the belt pulleys to adapt to different bore diameters by exchanging the corresponding taper bush.

Assembly

- Clean all polished bush surface from grease, oil and dirt prior to assembly. Such surfaces are, in particular, the bore, the outside cone of the bush and all semi–bores and semi–thread bores. Also degrease the conical bore of the belt pulley.

- Introduce the taper bush now into the hub of the pulley until the specific semi–bores in the hub and in the bush coincide. Make sure that every thread (semi–thread) in the bush corresponds to a smooth semi-bore in the hub and vice versa. The fastening screws for the bush included in the supply are slightly lubricated with oil at its thread, point, and bottom part of its head and manually screwed into the provided holes. Further keep in mind that the fastening bores are those, which are provided with a semi–thread in their hubs.

- Now push the belt pulley unit with the pre–assembled taper bush to its correct position of the shaft. When using a key scat, insert key first into keyway of shaft prior to assembling the bush. Only use keys supporting on their edges. Now tighten the fastening screws of the bush uniformly and step–by–step with the help of a torque wrench until reaching the recommended starting torque according to Table No. 3, in order to prevent any cocking between bush and pulley. Make sure that, at first, the bush is clamped on the shaft, and that the hub slides into its end position only afterwards. With light blows of a hammer on a sleeve or a wooden block, you can drive down the clamping bush into the cone to slightly increase the clamping effect. After that, the screws can be tightened until the recommended starting torque is obtained. Never exceed the starting torques mentioned in the assignment table.

- With perpendicular shaft arrangement and particularly rough operation (shock load), take further safety precautions against any movement of the taper clamping bush on the shaft.

- Empty bores are filled with grease to avoid penetration of dirt or foreign substances. After a short warm–up period of the drive under load, it is recommended to check the fastening screws of the taper clamping bush.

Dismantling

For dismantling, loosen all the fastening screws of the taper bush degrease the bores filled with lubricant. Degrease the pull–off bores, up to 2 items according to the bush size each, and slightly lubricate them with oil. Yu can recognize the pull–off from the fact that the relevant semi–threads are located on the bush side.

- The screws are screwed into the pull–off bores and steadily tightened until the taper bush comes free from the hub and is freely moveable on the shaft.

- The parts can now be removed from the shaft.

Table No. 3

Bush No.	Bush bore mm	Theoretical slip torque without key [Nm]	Recomended screw tightening torque, max. [Nm]
1210	16	82	15
	19	105	
	24	142	
	32	210	
1610	19	98	15
1615	24	135	
	38	240	
	42	265	
2012	24	165	25
	38	310	
	42	340	
	48	400	
	50	420	
2517	24	220	35
	38	380	
	42	430	
	48	510	
	55	600	
	60	670	
3020	38	520	70
3030	48	730	
	55	890	
	60	970	
	75	1300	
3535	42	1000	85
3525	60	1580	
	75	2150	
	90	2600	
4040	48	1700	120
4030	60	2150	
	75	3150	
	100	4400	
4545	55	2500	140
4535	75	3900	
	100	5500	
	110	6300	
5050	75	3950	200
5040	100	5650	
	125	7370	
6050	100	8950	550
	125	11900	
	150	14900	
7060	125	15600	550
	150	19400	
	175	23200	

Tightening and slip torques for taper bushes

The indicated slip torques for the corresponding tightening torques were determined on the test bench for the respective bore Ø and theoretical values for friction-type connection without key. If impact loading occurs then the slip torque should be divided by 2.

In principle it is recommended that the bushshaft connection is always made with a key. The recommended tightening torques should not be exceeded and are sufficient to secure the connection between the shaft and the bore against axial slip during normal operation.

For impact-loaded, vibrating or suspended operation, an additional mechanical retaining device should be fitted to prevent slippage or creeping on the shaft.

Trouble–Shooting Table

	FAULT	POSSIBLE CAUSE	REMEDY
PREMATURE BELT FAILURE	Broken belt(s)	Insufficiently rated drive Belt is rolled or levered on pulley Foreign body dropped into drive Extreme shock load	New calculation required On assembly, use retightening option Install suitable safety device or drive protection New calculation to adapt to shock load
	Belt(s) do(es) not resist load (creep); no visible cause	Insufficiently rated drive Traction body damaged Worn–out pulley grooves Movement axle distance	New calculation required Keep to correct assembly method Check groove wear, replace, if required Check drive for axle distance movement during operation
	Failure lateral assembly	Non–aligning pulleys Traction body damaged	Check and correct alignment Keep to correct assembly method
	Belt spalling and substructure detaching	Pulley too small Traction body damaged	Check drive design, use larger pulleys Increase diameter of outer tightening roller accordingly
STRONG OR UNUSUAL BELT WEAR,	Wear on the upper belt shell	Friction on safeguarding equipment Malfunction of tightening roller	Replace or repair safety equipment Replace the tightening roller
	Wear on the upper belt edge	Incorrect belt pulley seat (belt too small for groove)	Use the correct belt–pulley combination
	Wear on flanges	Belt creep Non–alignment Worn–out pulleys Wrong belt	Retighten until creep is gone Realign pulleys Replace pulleys Replace by correct belt size
	Wear on lower belt edge	Incorrect belt–pulley seat Worn–out pulleys	Use the correct belt–pulley combination Replace pulleys
	Wear on lower belt shell	Belt substructure on pulley groove (belt too small for groove) Worn–out grooves Dirty pulleys	Use the correct belt–pulley combination Replace pulleys Clean pulleys
	Crack formation in substructure	Pulley diameter too small Belt creep Outer tightening roller too small Incorrect storage	Use larger pulley diameter Retightening Use larger diameter for outer tightening roller Do not stretch belt too tight, do not bend or inflect. Avoid heat and direct sunlight

	FAULT	POSSIBLE CAUSE	REMEDY
STRONG OR SUUNUAL BELT WEAR	Burned out and hard edges and substructure	Belt creep Worn–out pulleys Insufficiently rated drive Wavy movement	Retighten until creep is gone Replace the pulleys New calculation of drive Check if there are any changes in the axle distance
	Extreme hardening of belt shell	Hot surrounding of belt	Improve drive ventilation
	Flocky, sticky or swollen belt surface	Pollution through oil or chemicals at belts or in the pulleys	Do not use belt stretching agents; remove oil, grease or chemicals
V– BELTS TWIST OR JUMP OFF THE DRIVE	Individual or composite belts	Shock load or vibration Foreign substances in pulley grooves Non–aligned pulleys Worn–out pulley grooves Traction body damaged Wrong position of flat tightening roller Wrong belt set Inappropriate drive design	Check drive design, use Power Band Shield grooves and drive New alignment of the pulleys Replace pulleys Use correct assembly and storage Procedures Carefully insert flat tightening roller into loose part of belt, as close as possible to the driving pulley Replace with new belt set. Do not mix old and new belts Check stability, axle distance and means of reducing vibration
BELT EXTENSIOND BEYOND RETIGHTENING VALUE	Composite belts will not extend uniformly	Non–aligned drive Dirty pulleys Broken traction body or damaged Substructure Wrong belt set	Realign and retighten drive Clean pulleys Replace all belts, assemble properly Assembly the correct belt set
	Individual belts or all belts expand in the same way	Not sufficient clearance for retightening High overloaded or not sufficiently rated drive Broken traction bodies	Check the amount of retightening Recalculation of the drive Replacement of belts, crrect assembly
NOISE CAUSED BY BELTS	Whistling or “chirping“	Belt creep Dirt	Retightening required Clean belt and pulleys
	Whipping noise	Loose belt Flat belt set Non–alignment	Retightening required Insert correct belt set New alignment of pulleys, so that all pulleys are equally loaded
	Grinding noise	Safety equipment is in grinding contact	Repair, replacement or new design of safety equipment

	FAULT	POSSIBLE CAUSE	REMEDY
NOISES CAUSED BY BELTS	Grinding noise	Bearings are damaged	Replace, align and grease
	Unusually loud drive	Wrong belt Worn–out pulleys Dirt on grooves	Use correct belt size Replace pulleys Clean pulleys, improve protection. Remove rust, colour or dirt from grooves
UNUSUAL VIBRATION	Fluttering belts	Tension of belt is too low Wrong belt sets Non–alignment of pulleys	Retighten Assemble new belt set Alignment of pulleys
	Excessive vibration in drive system	Wrong belt Unsuitable design of machinery or Equipment Pulleys jumped out Loose drive components	Use proper belt profile section for each pulley Check structure and clips for correct tightness Replace pulley Check all machine parts, safety equipment, motor supports, motor padding, bushes, clips and housing for stability, appropriate construction thickness, correct maintenance and assembly
FAULTS WITH COMPOSITE V–BELTS	Cover band coming off	Worn–out pulleys Wrong groove space	Replace pulleys Measure pulley grooves and replace with standard pulleys
	Worn–out or damaged cover band of belt	Safety equipment is obstructed Malfunction or damage of outer tightening roller	Check safety equipment Repair or replace outer tightening roller
	Composite belt comes off the drive	Dirty pulleys	Clean grooves, use individual belts to avoid dirt collecting in the grooves
	One or several ribs are miss tracking outside the pulley	Non–alignment Tension is too low	New alignment of drive Retighten

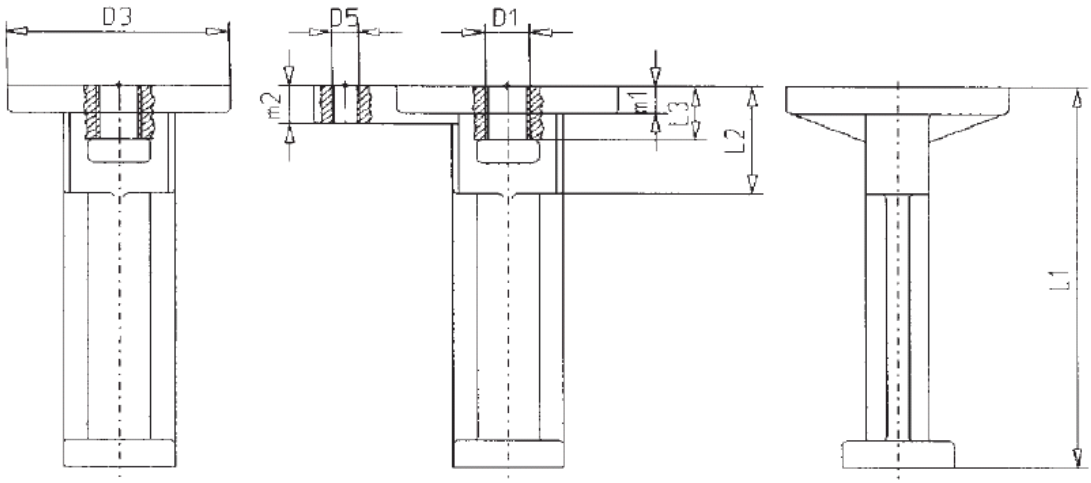
	FAULT	POSSIBLE CAUSE	REMEDY
FAULTS WITH PULLEYS	Broken or damaged pulley Pollution	Wrong assembly of pulleys Foreign substances in drive Excessive circumferential speeds Wrong assembly of belts	Do not tighten bush bolts beyond recommended torques Use appropriate safety equipment for drive Keep circumferential speed of pulleys below recommended maximum limits Do not use levers to mount belts on Pulleys
	Strong, fast wear of grooves	Excessive tension of belts Sand, dirt or other pollution	Retighten, check drive design Clean and protect the drive to the optimum extent
FAULTS WITH DRIVE	Bent or broken shaft	Extreme overstrain of belts Over–dimensioned drive* Accidental damage Error of machine design	Retighten Check drive design, mount smaller belts or fewer belts if required Recalculation of safety equipment Check machine design
	Safety equipment damaged	Damage by error or inappropriate design of safety equipment	Repair, rate referring to long life
HOT STORE	Over–tightened drive belt	Worn–out grooves, belt makes contact, but no power is transmitted unless it is Over tightened Wrong tension	Replace pulleys, tighten the drive properly Retighten
	Diameter of pulley too small Bad condition of bearings	Diameters of pulleys prescribed by motor manufacturer were not observed Over–dimensioned bearings Insufficient maintenance of bearings	Recalculation of drive Check bearing calculation Align and lubricate bearings
	Pulleys are seated on shaft too close to the front	Error or obstacle	Position the pulleys as close as possible to bearings, eliminate obstacles
	Belt creep	Tension of drive is too small	Retighten

** Too many drive belts or too wide ones can strongly affect the motor or driving shafts. This may occur if load requirements for a drive are reduced, but the belts are not recalculated accordingly. This can also occur by calculation of too high quantities for belts. The forces arising due to belt tension will be too high for those shafts.*

Instructions for Foundation Block Installation

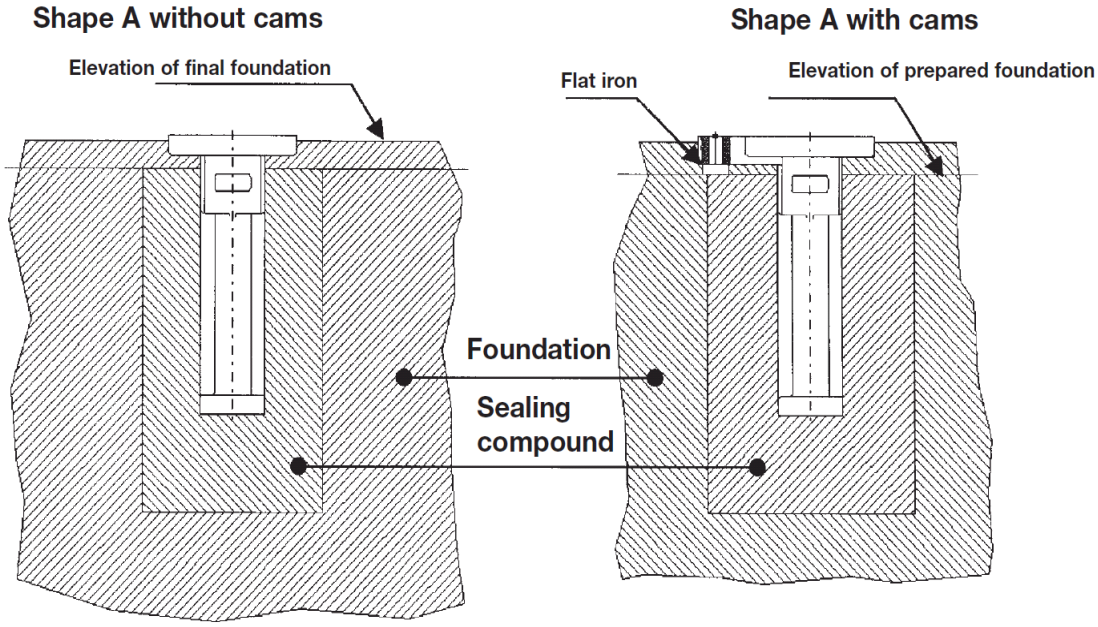
Regarding their functional dimensions, the foundation blocks are conforming to DIN 799. They are manufactured of the material **EN–GJL 200** in accordance with DIN EN 1561.

For installation, use foundation blocks without any paint. Prepare openings in the provided cement floor in specified sizes referring to DIN 799 where the foundation blocks can be sealed. To prevent concrete or mortar from penetrating into the threads, seal them or fill them with grease. For pouring the openings, use concrete of the same solidity and granulation classes as for the surrounding concrete surfaces.



D1	L1	D3	D5	L2	L3	m1	m2
M 10	125	56	M 8	35	20	8	16
M 12	150	72	M 12	40	22	10	20
M 16	180	85	M 12	50	25	12	20
M 20	200	100	M 12	56	28	14	20
M 24	250	125	M 16	70	36	18	25
M 30	280	140	M 16	79	40	20	30
M 36	340	180	M 20	100	50	25	25
M 42	425	225	M 20	120	60	28	30
M 48	475	250	M 24	129	64	30	32

Fitting Example Foundation Block



Installation and Operating Manual Motor Slide Rails

1. Quality

Slide rail made of material: EN–GJL–200 according to DIN 1561. Fastening screws for the machine, as well as straining screws, are included in the supply.

Stone bolts with hexagonal nut for anchoring are to be ordered separately.

2. Safety Precautions

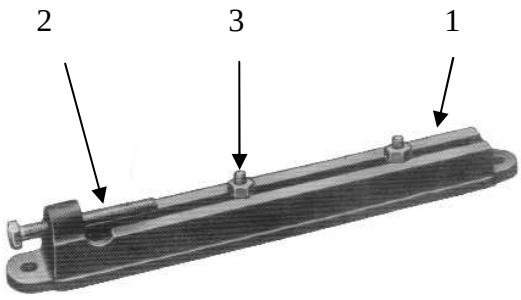
Screws coming loose are very dangerous. Always make sure that you keep to the
prescribed starting torques for the screws, and to check them regularly.

Never carry out adjusting work with the machine running. Make sure to lock the main switch of the machine against unintentional restarting.

3. Mounting the Slide Rail

When fastening the slide rails to foundations, check, prior to tightening the stone bolts, the firm seat of the foundation screws after the specified setting period.

When fastening the slide rails on frames, plates and such, use rails with machined base surface in order to avoid breakage due to distortion. All contact surfaces should be even and properly aligned.

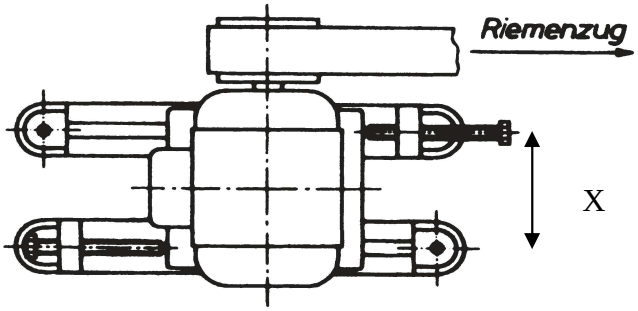


1 Slide rail
2 Tightening screw
3 Fastening screw and nut

The connecting screws may not turn themselves; there must be enough space for the wrench.

3.1 Arrangement of slide rails

Keep to the motor foot distance X. Arrangement of slide rails acc. to Fig. 1. Make sure that the slide rails are placed in parallel. Maximum parallel deviation should not exceed X +/- 1mm. The height relating to each other can be checked with a spirit level.



3.2 Slide Rail Design

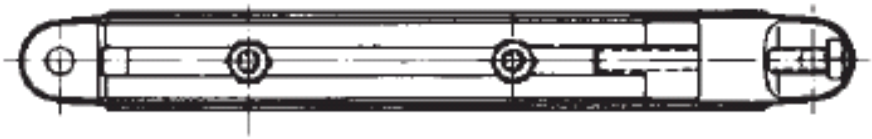


Fig. 2
Lightweight version A up to 650 mm
and DIN 42923–version up to 500 mm

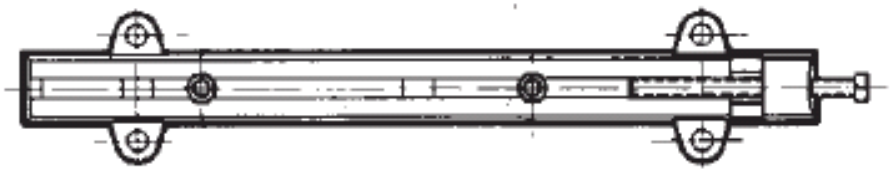


Fig. 3
Lightweight version B up to 700 - 1500 mm
and DIN 42923–version from 630 - 1000 mm

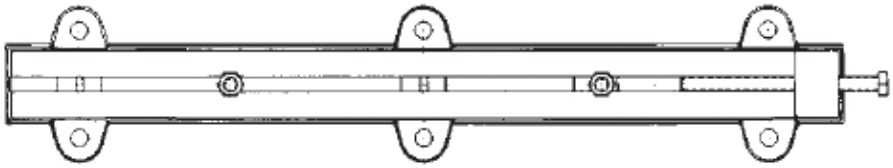


Fig. 4
Lightweight version C from 1600 - 2200 mm
and DIN 42923 Version - 1250 mm

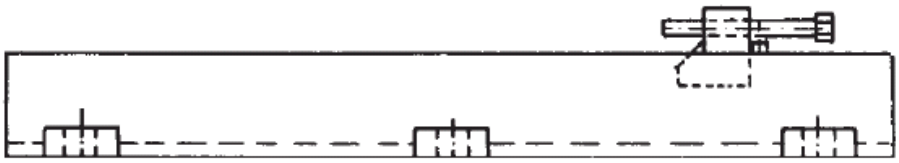


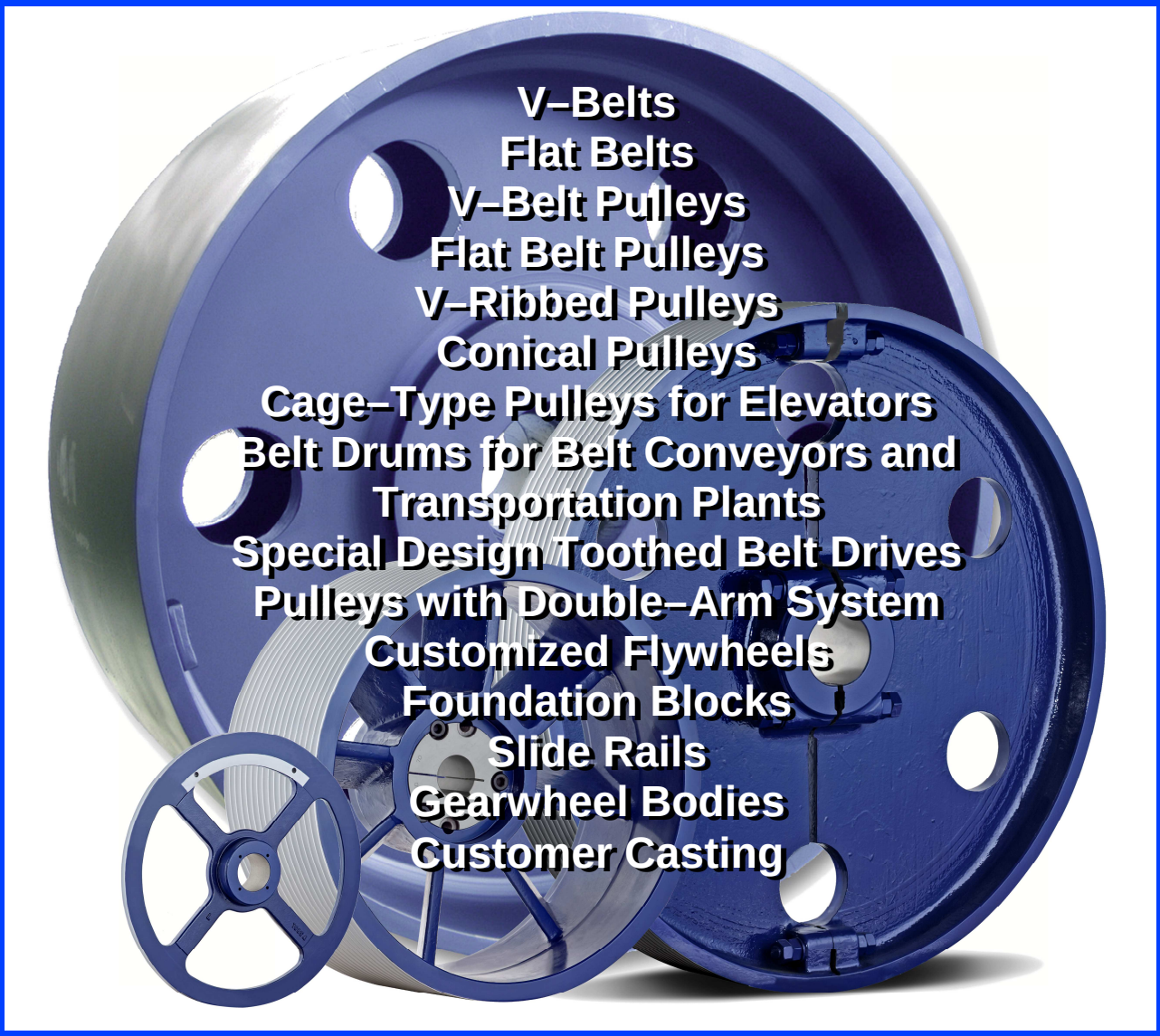
Fig. 5
Heavy version WEN 40003

4. Fastening the Motor

Place the motor on the slide rail and tighten the fastening nut until, at first, the motor still remains moveable. Accurately align the motor by means of the straining screws. With flat belt drives or chain drives, adjust the required initial tension (keep to supplier´s instruction). Then definitely tighten the fastening nuts..

Notes

LÜTGERT-DRIVES



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Lütgert & Co GmbH
Friedrichsdorfer Straße 48
33335 Gütersloh | Germany

Fon +49 5241 7407-0
vertrieb@luetgert-antriebe.de
www.luetgert-antriebe.de

Made in Germany